



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/537,929

06/07/2005

Yin Hao

A3-257 US

8588

7590

04/04/2006

Robert J Zeitler
Molex Incorporated
2222 Wellington Court
Lisle, IL 60532

EXAMINER

GIRARDI, VANESSA MARY

ART UNIT

PAPER NUMBER

2833

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/537,929

Applicant(s)

HAO, YIN

Examiner

Vanessa Girardi

Art Unit

2833

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 June 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the electronic component, circuit board, plurality of solder balls and terminal channels must be shown or the feature(s) canceled from claims 1 and 9. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim objections

2. Claims 9-11 are objected to; claim 9, line 2 contains a minor grammatical error and spelling error; --circuit board via a plurality of solder balls *soldering* onto the circuit *bard*--. It is suggested the italicized words are changed from --soldering-- to "soldered" and --bard-- to "board".

Claim Rejections - 35 USC § 112, second paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1 -11 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite because claims 1 and 9 recite a product (conductive terminal) and define that product by the process of making it (stamped and formed). These claims recite limitations from more than one statutory class of invention MPEP 2173.05(p).

Claim Rejections - 35 USC § 103

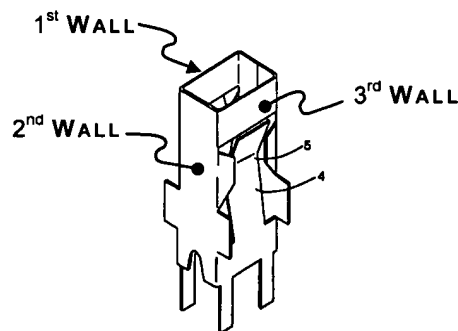
The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 5 and 6 are rejected under 35 U.S.C. §103(a) as being unpatentable over Higuchi et al. (US 5,975,963) in view of Wilson et al. (US 6,644,985 B2).

Higuchi et al. shows conductive terminal 1 capable of being received within a terminal channel 12 defined in an insulative housing 11, having a contact portion 5 and a mounting portion 7 electrically connecting with the circuit board via a solder ball 21 comprising:

a first wall, a second wall connecting with the first wall in a certain angle and a third wall, connecting with the second wall in a certain angle and opposite to the first wall, and the mounting portion 7 extending out of the insulative housing 11 (Fig. 2).



Art Unit: 2833

However Higuchi et al. does not show the conductive terminal in relation to an electronic component and a circuit board via the solder ball received in a pyramidal space.

Wilson et al. shows a conductive terminal **33** in relation to an electronic component and a circuit board (Col. 2, lines 59-62) having a pyramidal space (Fig. 6D) **52** receiving a solder ball **9**.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the conductive terminal of Higuchi et al. to have the relationship between an electronic component and a circuit board as taught by Wilson et al. using a solder ball thus creating a conductive terminal that would have greater stability within the terminal channel coupled with improving adhesion of the solder ball (Col. 9, lines 37-41) to the mounting portion of the terminal. Both of these improvements would serve to enhance reliability during application and help minimize waste during production.

With respect to claim 2; Higuchi et al. as modified by Wilson et al. has been discussed above as applied to claim 1.

However Higuchi et al. does not show the mounting portion defines a pyramidal space.

Wilson et al. shows the mounting portion **47** defines the pyramidal space **52** by using a side wall **44** connecting with an end of the first wall **43** which circles around a fictitious central line as an axis (Fig. 6C) Axis A.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to further modify the conductive terminal of Higuchi et al. whereby the mounting portion as taught by Wilson et al. would define a pyramidal space fashioned from a sidewall encircling a fictitious axis. Such a modification would increase the surface area available for the adhesion of the solder ball to the mounting portion (Col. 9, lines 37-41) creating greater stability within the contact assembly during its use and manufacturing.

With respect to claim 5; Higuchi et al. as modified by Wilson et al. has been discussed above. Higuchi et al. further shows the contact portion 5 comprises a first spring arm 4 formed on the first wall 3 and a second spring arm 4 corresponding to the first spring arm 4 and formed on the second wall 3, the first spring arm 4 and the second spring arm 4 are adjacent to form a spring receiving structure (Fig. 2).

With respect to claim 6; Higuchi et al. as modified by Wilson et al. has been discussed above as applied to claim 1.

However Higuchi et al. does not show the pyramidal space.

Wilson et al. shows the mounting portion 47 defines the pyramidal space 52 in which the pyramidal space 52 is open at a top portion (Fig. 6E).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to further modify the conductive terminal of Higuchi et al. whereby the pyramidal space as taught by Wilson et al. is open at the top which would improve solder management and solder adhesion (Col. 4, lines 51, 52) creating a more reliable contact.

5. Claims 1, 3, and 8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Higuchi et al. (US 5,975,963) in view of Korsunsky (US 6,623,284 B1).

Higuchi et al. shows conductive terminal 1 capable of being received within a terminal channel 12 defined in an insulative housing 11, having a contact portion 5 and a mounting portion 7 electrically connecting with the circuit board via a solder ball 21 comprising: a first wall, a second wall connecting with the first wall in a certain angle and a third wall, connecting with the second wall in a certain angle and opposite to the first wall, and the mounting portion 7 extending out of the insulative housing 11 (Fig. 2).

However Higuchi et al. does not show the conductive terminal in relation to an electronic

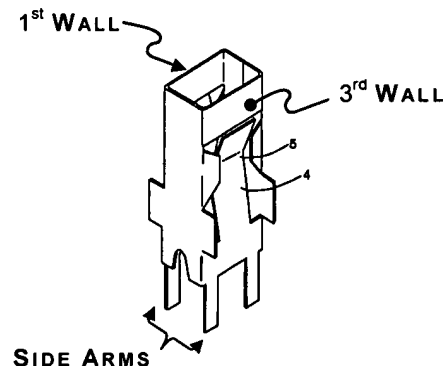
Art Unit: 2833

component and a circuit board via the solder ball received in a pyramidal space.

Korsunsky shows a conductive terminal **100** in relation to an electronic component and a circuit board (Fig. 1) having a pyramidal space **36** receiving a solder ball **4**.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the conductive terminal of Higuchi et al. to have the relationship between an electronic component and a circuit board as taught by Korsunsky using a solder ball received in a pyramidal space which contributes to proper positioning of the solder ball (Col. 3, lines 32, 33). Both of these improvements would serve to enhance reliability during use of the product and help minimize waste during production.

With respect to claim 3; Higuchi et al. as modified by Korsunsky has been discussed above as applied to claim 1. Higuchi et al. further shows the conductive terminal **100** in which the mounting portion **7** comprises a first side arm connecting with an end of the first wall and a second side arm connecting with an end of the third wall, the first side arm and the second side arm separately extend out of the insulative housing (Fig. 1) **36**.



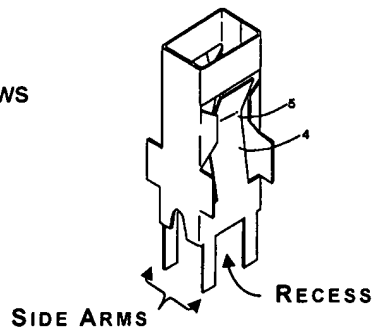
However Higuchi et al. does not show the conductive terminal side arms define a pyramidal space

Korsunsky shows a conductive terminal **3** having side arms **34** that define a pyramidal space **36**.

Art Unit: 2833

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the conductive terminal of Higuchi et al. whereby the side arms are not flush with the housing but left at an obtuse angle to one another as taught by Korsunsky (Col. 3, lines 30-35) which aid in positioning of the solder ball prior to adhesion which would serve to minimize waste during production.

With respect to claim 8; Higuchi et al. shows at least one of the side arms includes a recess.



6. Claims 4 and 7 are rejected under 35 U.S.C. §103(a) as being unpatentable over Higuchi et al. (US 5,975,963) and Korsunsky (US 6,623,284 B1) as applied to claims 3 and 1 above, and further in view of Ju (US 6,530,788 B1). Higuchi et al. as modified by Korsunsky has been discussed above.

However neither Higuchi et al. nor Korsunsky show or teach the mounting portion of the terminal comprising a horizontal portion.

Ju shows a conductive terminal **100** in which the mounting portion (*RELATIVE TO THE SOLDER BALL 11*) of the conductive terminal comprises a horizontal portion **102** connecting with the second wall (*AT 101*) the horizontal portion **102** is between the first side arm and the second side arm (Fig. 10).

With respect to claim 7; Ju shows the horizontal portion **102** is located between the first **104** and third walls **105**.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to apply the teachings of the horizontal portion located between the first and second side arm as taught by Ju (Col. 4, lines 14-23) to further modify the conductive terminal of Higuchi et al. / Korsunsky to further ensure the stability of the contact assembly, particularly where the solder ball is concerned thus minimizing defective manufacturing processes.

7. Claims 9 and 11 are rejected under 35 U.S.C. §103(a) as being unpatentable over Korsunsky (US 6,623,284 B1) in view of Higuchi et al. (US 5,975,963). Korsunsky shows an electrical connector for connecting between an electronic component and a circuit board via a plurality of solder balls soldering onto the circuit board having an insulative housing forming a mounting surface adjacent to the circuit board and a receiving surface for supporting the electronic component the insulative housing defining a plurality of terminal channels extending through the mounting surface and the receiving surface a plurality of stamped and formed conductive terminals respectively received in the corresponding terminal channels (Col. 2, lines 8-26) comprising:

a conductive terminal **3** having a mounting portion **340** electrically connecting with the circuit board **8** via the solder ball **4**, the mounting portion **340** defining a pyramidal space **36** extending out of the mounting surface **202** of the insulative housing **2** for receiving the solder ball **4**.

However Korsunsky does not show the conductive terminal having three walls.

Higuchi et al does show a conductive terminal **1** having a first wall, a second wall connecting with the first wall in a certain angle and a third wall connecting with the second wall in a certain angle and opposite to the first wall (*ILLUSTRATED ABOVE WITH RESPECT TO CL. 1*), the conductive terminal forming a contact portion **5** electrically connecting with the electronic

Art Unit: 2833

component **10** and a mounting portion **7** electrically connecting with the circuit board **11**.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the conductive terminal of Higuchi et al. to have the relationship between an electronic component and a circuit board as taught by Korsunsky using a solder ball thus creating a conductive terminal that would have greater stability within the terminal channel coupled with improving adhesion of the solder ball to the mounting portion of the terminal. Both of these improvements would contribute to greater stability within the contact assembly during its use and manufacturing.

With respect to claim 11; Korsunsky as modified by Higuchi et al. has been discussed above as applied to claim 9. Korsunsky shows the mounting portion **340** of the conductive terminal **3** comprises a first and second side arms **34** adjacent to one end of the mounting surface **202**, where the first and second side arms are aslant (Fig. 1) and extend out of the mounting surface **202** and are apart from each other to define a cone-shaped pyramidal space **36**.

8. Claim 10 is rejected under 35 U.S.C. §103(a) as being unpatentable over Korsunsky (US 6,623,284 B1) and Higuchi et al. (US 5,975,963) as applied to claim 9 above, and further in view of Wilson et al. (US 6,644,985 B2). Korsunsky as modified by Higuchi et al. has been discussed above.

However neither Korsunsky nor Higuchi et al. show or teach the pyramidal space encircling an imaginary axis.

Wilson et al. shows a conductive terminal **33** where the mounting portion **47** defines the pyramidal space **52** by using a side wall **44** connecting with an end of the first wall **43** which circles around a fictitious central line as an axis (Fig. 6C) Axis A.

Art Unit: 2833

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to further modify the conductive terminal of Korsunsky / Higuchi et al. whereby the mounting portion as taught by Wilson et al. would define a pyramidal space fashioned from a sidewall encircling a fictitious axis. Such modification would increase the surface area available for the adhesion of the solder ball to the mounting portion (Col. 9, lines 37-41) creating greater stability within the contact assembly during its use and manufacturing.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Girardi: Telephone number (571) 272-5924.

Monday – Thursday 7 a.m. to 5:30 p.m. (EST)

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paula Bradley can be reached on (571) 272-2800 ext 33.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

VG
Art Unit 2833
March 30, 2006


THO D.TA
PRIMARY EXAMINER